NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION
US DEPARTMENT of COMMERCE
MICROWAVE RADIO PATH CALCULATION SPREADSHEET 30-Jul-92

PROJECT NAME		?		
ENGINEER		?		
FREQUENCY (GHz)		6.70		
1. SITE NAME		?		?
3. LATITUDE, North,	Degrees	?		?
	Minutes	?		?
	Seconds	?		?
4. LONGITUDE, West,	Degrees	?		?
	Minutes	?		?
	Seconds	?		?
5. SITE ELEVATION, AMSL	Feet	?		?
6. AZIMUTH FROM NORTH	Degrees	0.0		0.0
7. PATH LENGTH	Miles		30.0	
8. PATH ATTENUATION	dB		142.7	
10. TOWER TYPE		?		?
11. ANTENNA HEIGHT,AGL	Feet	100		100
12. TRANSMISSION LINE LENGTH	Feet	110		110
13. TRANS. LINE TYPE		EW63		EW63
14. TRANS. LINE LOSS	dB/100'	1.40		1.40
15. TRANSMISSION LINE LOSS	dB	1.5		1.5
16. MISCELLANEOUS LOSSES	dB	0.5		0.5
17. PROTECTED TERMINAL LOSS	dB	?		?
18. DIVERSITY RECEPTION LOSS	dB	?		?
19. TOTAL FIXED LOSSES	dB	2.0		2.0
20. TOTAL LOSSES(PATH AND FIXED)	dB		146.7	
21. ANTENNA DIAMETER	Feet	8.0		8.0
22. ANTENNA TYPE		SOLID		SOLID
23. ANTENNA GAIN	dBi	42.3		42.3
24. TOTAL ANTENNA GAINS	dB		84.6	
25. NET SYSTEM LOSS	dB		62.2	
26. RADIO EQUIPMENT TYPE AND CAPACITY			ANALOG 600	
27. MINIMUM TRANSMITTER POWER	dBm		32.0	
28. RECEIVER THRESHOLD	dBm		-80.0	
29. NET SYSTEM GAIN	dB		112.0	
30. MEDIAN RECEIVED POWER	dBm		-30.2	
30. FLAT FADE MARGIN	dB		49.8	
31. DISPERSIVE F.M. (DIG. ONLY)	dB		?	
32. COMPOSITE FADE MARGIN	dB		49.8	

WEIGHTED RAYLEIGH PROPAGATION RELIABILITY FOR ATMOSPHERIC MULTIPATH

TERRAIN/CLIMATE FACTOR	0.25 TO 6			0.25
MEAN ANNUAL TEMPERATURE	Deg F			50.0
DIVERSITY SPACING	Feet			30.0
NON-DIVERSITY OUTAGE TIME	Sec/yr			9.5
NON-DIVERSITY AVAILABILITY	Percent			99.99997
SPACE DIVERSITY IMPROV. FACTOR	Decimal			1350.7
SPACE DIVERSITY OUTAGE TIME	Sec/yr			0.0
SPACE DIVERSITY AVAILABILITY	Percent			100.00000
BELL SHORT HAUL OBJECTIVE	Sec/yr			192.0

NOTE: FOR CALCULATION METHOD OF RELIABILITY REFER TO A. VIGANTS,
SPACE DIVERSITY ENGINEERING, BSTJ, VOL. 54, NO. 1, JAN 1975

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US DEPARTMENT of COMMERCE
MICROWAVE RADIO PATH CALCULATION SPREADSHEET 30-Jul-92

PROJECT NAME		?		
ENGINEER		?		
FREQUENCY (GHz)		1.90		
1. SITE NAME		?		?
3. LATITUDE, North,	Degrees	?		?
	Minutes	?		?
	Seconds	?		?
4. LONGITUDE. West,	Degrees	?		?
	Minutes	?		?
	Seconds	?		?
5. SITE ELEVATION, AMSL	Feet	?		?
6. AZIMUTH FROM NORTH	Degrees	0.0		0.0
7. PATH LENGTH	Miles		50.0	
8. PATH ATTENUATION	dB		136.2	
10. TOWER TYPE		?		?
11. ANTENNA HEIGHT,AGL	Feet	100		100
12. TRANSMISSION LINE LENGTH	Feet	110		110
13. TRANS. LINE TYPE		1 5/8" FOAM		1 5/8" FOAM
14. TRANS. LINE LOSS	dB/100'	1.25		1.25
15. TRANSMISSION LINE LOSS	dB	1.4		1.4
16. MISCELLANEOUS LOSSES	dB	0.5		0.5
17. PROTECTED TERMINAL LOSS	dB	?		?
18. DIVERSITY RECEPTION LOSS	dB	?		?
19. TOTAL FIXED LOSSES	dB	1.9		1.9
20. TOTAL LOSSES(PATH AND FIXED)	dB		139.9	
21. ANTENNA DIAMETER	Feet	10.0		10.0
22. ANTENNA TYPE		GRID		GRID
23. ANTENNA GAIN	dBi	33.3		33.3
24. TOTAL ANTENNA GAINS	dB		66.6	
25. NET SYSTEM LOSS	dB		73.4	
26. RADIO EQUIPMENT TYPE AND CAPACITY			ANALOG 600	
27. MINIMUM TRANSMITTER POWER	dBm		32.0	
28. RECEIVER THRESHOLD	dBm		-80.0	
29. NET SYSTEM GAIN	dB		112.0	
30. MEDIAN RECEIVED POWER	dBm		-41.4	
30. FLAT FADE MARGIN	dB		38.6	
31. DISPERSIVE F.M. (DIG. ONLY)	dB		?	
32. COMPOSITE FADE MARGIN	dB		38.6	

WEIGHTED RAYLEIGH PROPAGATION RELIABILITY FOR ATMOSPHERIC MULTIPATH

TERRAIN/CLIMATE FACTOR	0.25 TO 6			0.25
MEAN ANNUAL TEMPERATURE	Deg F			50.0
DIVERSITY SPACING	Feet			60.0
NON-DIVERSITY OUTAGE TIME	Sec/yr			163.0
NON-DIVERSITY AVAILABILITY	Percent			99.99948
SPACE DIVERSITY IMPROV. FACTOR	Decimal			70.1
SPACE DIVERSITY OUTAGE TIME	Sec/yr			2.3
SPACE DIVERSITY AVAILABILITY	Percent			99.99999
BELL SHORT HAUL OBJECTIVE	Sec/yr			320.0

NOTE: FOR CALCULATION METHOD OF RELIABILITY REFER TO A. VIGANTS,
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PROJECT NAME		?		
ENGINEER		?		
FREQUENCY (GHz)		6.70		
1. SITE NAME		?		?
3. LATITUDE, North,	Degrees	?		?
	Minutes	?		?
	Seconds	?		?
4. LONGITUDE, West,	Degrees	?		?
	Minutes	?		?
	Seconds	?		?
5. SITE ELEVATION, AMSL	Feet	?		?
6. AZIMUTH FROM NORTH	Degrees	0.0		0.0
7. PATH LENGTH	Miles		50.0	
8. PATH ATTENUATION	dB		147.1	
10. TOWER TYPE		?		?
11. ANTENNA HEIGHT,AGL	Feet	100		100
12. TRANSMISSION LINE LENGTH	Feet	110		110
13. TRANS. LINE TYPE		EW63		EW63
14. TRANS. LINE LOSS	dB/100'	1.40		1.40
15. TRANSMISSION LINE LOSS	dB	1.5		1.5
16. MISCELLANEOUS LOSSES	dB	0.5		0.5
17. PROTECTED TERMINAL LOSS	dB	?		?
18. DIVERSITY RECEPTION LOSS	dB	?		?
19. TOTAL FIXED LOSSES	dB	2.0		2.0
20. TOTAL LOSSES(PATH AND FIXED)	dB		151.2	
21. ANTENNA DIAMETER	Feet	10.0		10.0
22. ANTENNA TYPE		SOLID		SOLID
23. ANTENNA GAIN	dBi	44.2		44.2
24. TOTAL ANTENNA GAINS	dB		88.4	
25. NET SYSTEM LOSS	dB		62.7	
26. RADIO EQUIPMENT TYPE AND CAPACITY			ANALOG 600	
27. MINIMUM TRANSMITTER POWER	dBm		32.0	
28. RECEIVER THRESHOLD	dBm		-80.0	
29. NET SYSTEM GAIN	dB		112.0	
30. MEDIAN RECEIVED POWER	dBm		-30.7	
30. FLAT FADE MARGIN	dB		49.3	
31. DISPERSIVE F.M. (DIG. ONLY)	dB		?	
32. COMPOSITE FADE MARGIN	dB		49.3	

WEIGHTED RAYLEIGH PROPAGATION RELIABILITY FOR ATMOSPHERIC MULTIPATH

TERRAIN/CLIMATE FACTOR	0.25 TO 6			0.25
MEAN ANNUAL TEMPERATURE	Deg F			50.0
DIVERSITY SPACING	Feet			30.0
NON-DIVERSITY OUTAGE TIME	Sec/yr			49.9
NON-DIVERSITY AVAILABILITY	Percent			99.99984
SPACE DIVERSITY IMPROV. FACTOR	Decimal			712.3
SPACE DIVERSITY OUTAGE TIME	Sec/yr			0.1
SPACE DIVERSITY AVAILABILITY	Percent			100.00000
BELL SHORT HAUL OBJECTIVE	Sec/yr			320.0

NOTE: FOR CALCULATION METHOD OF RELIABILITY REFER TO A. VIGANTS, SPACE DIVERSITY ENGINEERING, BSTJ, VOL. 54, NO. 1, JAN 1975

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15. ABSTRACT *(A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here.)*

The United States is identifying spectrum in the 2 GHz range for new, emerging technologies. Federal Government spectrum has been suggested as an option for accommodating FCC licensees relocated to other bands to make room for these new technologies. This report documents a study that examines the feasibility of relocating non-government fixed service systems into the 1710-1850 MHz band. It summarizes current use of 1710-1850 MHz and the bands allocated for non-government fixed service use in the 1850-2200 MHz range. The study found that 1710-1850 MHz could accommodate a limited number of 2 GHz private-sector stations. Guidelines, based on path length, are developed that could be used to determine which 2 GHz private-sector fixed systems are potential candidates for accommodation in the 1710-1850 MHz band.

16. Key Words *(Alphabetical order, separated by semicolons)*

Emerging Technologies; 1710-1850 MHz Band; 1850-2200 MHz Band; Fixed Service

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